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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/076,333	02/19/2002	Hitoshi Yamada	1082.1042	2004

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EXAMINER	
DONG, DALEI	

ART UNIT	PAPER NUMBER
2875	

DATE MAILED: 03/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/076,333	YAMADA ET AL.	
	Examiner	Art Unit	
	Dalei Dong	2875	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) *1-3* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *4-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 February 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. After further Examination of the Application, Examiner withdrew the Final Rejection issued February 23, 2004 and a New Ground of Rejection is set forth below.

Election/Restrictions

2. Claims 1-3 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected a gas discharge tube, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper Filed on January 26, 2004.

Applicant's election of a method of manufacturing a gas discharge tube in Paper Filed January 26, 2004 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Specification

3. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 4-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 3,809,944 to Jongerius in view of U.S. Patent No. 6,376,691 to Celinska in further view of U.S. Patent No. 5,514,934 to Matsumoto.

Regarding to claims 4-21, Jongerius discloses in Figure 1, "the glass envelope of the lamp. A reflection coating 2 consisting of fine-grained TiO.sub.2 is provided on the inner side of this glass envelope, which coating supports on its inner side the luminescent coating 3, for example, consisting of willemite. A longitudinal aperture 4 is recessed both in the reflection coating 2 and in the luminescent coating. The glass in the aperture is coated with a transparent coating of conducting tin oxide 5 obtained by spraying on a mixture of tin chloride, ethyl alcohol and a slight quantity of hydrofluoric acid. This spraying on was effected at a glass envelope temperature of approximately 600.degree. C in such a manner that the resistance of the coating in the finished lamp measured from end to end was 30 to 50 kOhm" (column 2, lines 45-60).

Jongerius also discloses "if an indium oxide layer instead of a transparent conducting tin oxide layer is provided, use is made of, for example, a spraying solution which contains indium chloride and a small quantity of tin chloride as a doping material

in butyl acetate. The comparative results obtained therewith do not essentially deviate from the results shown in the above-mentioned table" (column 3, lines 23-29).

Jongerius further discloses in Figure 3, "a low pressure mercury vapor discharge lamp wherein the transparent coating extends over the entire circumference of the envelope and engages the glass at all areas. Layer 5 is the transparent coating, layer 2 is again the reflective layer and layer 3 the luminescent layer" (column 3, lines 34-39).

However, Jongerius does not disclose the coating solution is comprises of an organic metal compound and at least two discharge electrodes on an outside of the tube. Celinska teaches "the final precursor applied to a substrate surface may be a solution of initial precursors. Preferably, each initial precursor contains an organic precursor compound, or organic dopant precursor compound, for forming a metal oxide. An initial precursor is typically formed by mixing the metal or metals, for example, tin, or an alkoxide of the metal, with a carboxylic acid, or with a carboxylic acid and an alcohol, and conducting chemical reactions in a solvent. Metal alkoxides may be selected from a group including methoxides, ethoxides, isopropoxides, n-butoxides and pentoxides. Carboxylic acids that may be used include 2-ethylhexanoic acid, octanoic acid, and neodecanoic acid, preferably 2-ethylhexanoic acid. Alcohols that maybe used include 2-methoxyethanol, 1-butanol, 1-pentanol,2-pentanol, 1-hexanol, 2-hexanol, 3-hexanol, 2-ethyl-1-butanol, 2-ethoxyethanol, and 2-methyl-1-pentanol, preferably 2-methoxyethanol. Solvents that may be used include xylenes, n-octane, 2-methoxyethanol, n-butyl acetate, n-dimethylformamide, 2-methoxyethyl acetate, methyl isobutyl ketone, methyl isoamyl ketone, isoamyl alcohol, cyclohexanone, 2-ethoxyethanol, 2-methoxyethyl ether, methyl

butyl ketone, hexyl alcohol, 2-pentanol, ethyl butyrate, nitroethane, pyrimidine, 1, 3, 5-trioxane, isobutyl isobutyrate, isobutyl propionate, propyl propionate, ethyl lactate, n-butanol, n-pentanol, 3-pentanol, toluene, ethylbenzene, 1-butanol, 1-pentanol, 2-pentanol, 1-hexanol, 2-hexanol, 3-hexanol, 2-ethyl-1-butanol, 2-ethoxyethanol, and 2-methyl-1-pentanol, as well as many others. The metal, metal alkoxide, acid, and alcohol react to form a mixture of metal-alkoxocarboxylate, metal-carboxylate and/or metal-alkoxide, which mixture is heated and stirred as necessary to form metal-oxygen-metal bonds and boil off any low-boiling point organics that are produced by the reaction. The alcohol is preferably 2-methoxyethanol or 2-methoxypropanol. The carboxylic acid is preferably 2-ethylhexanoic acid. The reaction is preferably conducted in a xylenes or n-octane solvent. The reaction of the mixture is usually conducted in a nitrogen atmosphere. The reaction may be conducted at room temperature by stirring the mixture for a time period of from 6 to 48 hours. It is often preferable to heat the mixture at a temperature in the range of from 30.degree. C. to 200.degree. C. to enhance the reaction. The reaction is typically conducted using a reflux condenser. To remove water and volatile organics after reaction, the reaction mixture is heated using a distillation column at a temperature from 50.degree. C. to 200.degree. C. Liquid precursors of the invention are typically made in batches prior to their use. It is a feature of the invention that the liquid precursors have a long shelf life and can, therefore, be stored for several months. Immediately before application of a liquid precursor to a substrate surface, final preparation steps may be conducted, including mixing, solvent exchange, and dilution. A liquid precursor is typically diluted to a concentration of from 0.1 to 0.5 moles of the

desired metal organic precursor compound per liter of solution" (column 10, line 47 to column 11, line 34).

Celinska also teaches "the special liquid precursors are prepared to be stable so that they have a relatively long shelf-life, at least between two and six months duration. In contrast, the solutions used in the sol-gel methods disclosed in the prior art are chemically unstable and have virtually no shelf-life. The stability of the precursors contributes to cost-efficiency and uniformity among production runs" (column 12, lines 6-12).

Celinska further teaches "for liquid deposition methods, such as misted deposition and spin-on techniques, the preferred inventive liquid precursor for depositing a metal oxide thin film is a nonaqueous metal organic liquid precursor solution in which a solvent comprises xylenes, n-octane or n-butyl acetate, and a metal organic precursor compound is a metal ethylhexanoate. When a liquid precursor is prepared and stored for longer than one day, the solvent preferably comprises xylenes only and the liquid precursor has a concentration of approximately 0.5 molar. When the solution is about to be used, preferably it is diluted with n-octane or n-butyl acetate to about 0.2 molar concentration before application to a substrate. Preferred liquid precursors for oxides of tin, antimony, indium, niobium, tantalum, bismuth, cerium, yttrium, titanium, zirconium, hafnium, silicon, zinc, and magnesium, among others, comprise ethylhexanoates of these metals" (column 12, lines 13-29).

Matsumoto discloses in Figure 1, "a fluorescent lamp 1, a glass bulb 2 has a straight cylinder form having dimensions of, for example, a diameter of 10 mm and a

length of 220 mm, and a fluorescent substance layer 3 is formed on almost the entire internal surface of the glass bulb 2. A rare gas such as xenon at a pressure such as 70 Torr is enclosed in the glass bulb 2. A part having a width such as approximately 4 mm along the entire length of the glass bulb 2, on which the fluorescent substance layer 3 is not formed, constitutes a light output part 4 for emitting the light generated within the glass bulb 2 to the outside. A pair of external electrodes 5a and 5b having a width such as approximately 12 mm are mounted on the external peripheral surface of the glass bulb 2 along the entire length thereof except at the light output part 4 spaced apart by, for example, approximately 2 mm less than the width of the light output part 4 on the opposite side to the light output part 4. An insulating member 8 for preventing a dielectric breakdown between the electrodes 5a and 5b on the external peripheral surface of the lamp is formed on the external surface of the glass in the space between the external electrodes 5a and 5b. A power source 7 for supplying electric power is connected to the external electrodes 5a and 5b through lead wires 6a and 6b" (column 5, lines 45-67).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilize the organic metal compound of Celinska as well as the plurality of external electrodes of Matsumoto for the discharge lamp of Jongerius in order to provide a large light output and a stable discharge and selectively generating a discharge in a plurality of parts; while lowering the temperature during the anneal process and thus reduce the stress applied on the discharge tube and furthermore prolong its shelf-life.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following prior art are cited to further show the state of the art of a method of manufacturing a discharge tube.

U.S. Patent No. 4,983,881 to Eliasson.

U.S. Patent No. 5,013,966 to Saikatsu.

U.S. Patent No. 5,049,777 to Mechtersheimer.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dalei Dong whose telephone number is (571)272-2370. The examiner can normally be reached on 8 A.M. to 5 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra O'Shea can be reached on (571)272-2378. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

D.D.
March 18, 2004

ALAN CARIASO
PRIMARY EXAMINER